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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/750,472

12/31/2003

Jeffrey M. Amsden

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CORNING INCORPORATED

SP-TI-3-1

CORNING, NY 14831

EXAMINER

LEUNG, JENNIFER A

ART UNIT

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1797

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/750,472	<b>Applicant(s)</b> AMSDEN ET AL.	
	<b>Examiner</b> JENNIFER A. LEUNG	<b>Art Unit</b> 1797	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 02 June 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-4 and 6-12 is/are pending in the application.
- 4a) Of the above claim(s) 7-11 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4, 6 and 12 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>1-28-08</u> .   | 6) <input type="checkbox"/> Other: _____                          |

**DETAILED ACTION**

***Response to Amendment***

1. Applicant's amendment filed on June 2, 2008 has been carefully considered. The changes made to the specification are acceptable. Claim 5 is cancelled. Claims 7-11 are withdrawn. Claim 12 has been added. Claims 1-4, 6 and 12 are under consideration.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

2. Claims 1-4, 6 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Carmello et al. (EP 1110605) in view of Beck (US 3,887,004).

Regarding claims 1, 2, 4, 6 and 12, Carmello et al. discloses a tubular reactor comprising a catalyst-filled reactor tube disposed in a reservoir of circulating heat-exchange fluid (see section [0044] and FIG. 2),

wherein the catalyst in the reactor tube includes at least one monolithic catalyst or

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catalyst support structure (see FIG. 1), the monolithic structure being formed of a heat-conductive material characterized by a first average linear coefficient of thermal expansion (e.g., a metal such as aluminum, copper; see sections [0020], [0036];

wherein the reactor tube is formed of a heat conductive material characterized by a second average linear coefficient of thermal expansion (e.g., a metal such as nickel; see section [0044]); and

wherein the first average linear coefficient of thermal expansion is greater than the second average linear coefficient of thermal expansion, as evidenced by Applicant's disclosure (at section [0053] of the specification):

“Examples of tube and monolith construction materials providing a *positive monolith-tube thermal expansion differential* include monoliths composed of *aluminum or copper* mounted within reactor tubes composed of *nickel* or steel.”

The tubular reactor in FIG. 2 is a pilot-scale reactor comprising a single catalyst-filled reactor tube. Carmello et al., however, discloses that, in industrial practice, the tubular reactor conventionally comprises multiple catalyst-filled reactor tubes (see, e.g., section [0025]).

Accordingly, it would have been obvious for one of ordinary skill in the art at the time the invention was made to configure the tubular reactor of Carmello et al. to comprise multiple catalyst-filled reactor tubes, on the basis of suitability for industrial practice. Furthermore, the duplication of parts for multiplied effect was held to have been obvious. *St. Regis Paper Co. v. Beemis Co. Inc.* 193 USPQ 8, 11 (1977); *In re Harza* 124 USPQ 378 (CCPA 1960).

Although the “operating gap distance” is not specifically calculated by Carmello et al., the tubular reactor of Carmello et al. inherently meets or is obvious over the claimed limitation of an operating gap distance that “does not exceed about 250  $\mu\text{m}$ ”. In particular, it is noted that

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Carmello et al. discloses,

“... The monolith should be *in contact* with the fixed fed reactor tube walls in such a way as to provide sufficient heat removal.” (see section [0019]; also, see claim 25).

“Each monolith had a cylindrical shape... *its external diameter (d) being the same as the internal diameter of the reactor tubes...*” (see section [0037]).

Thus, the operating gap distance ( $\text{Gap}_{\text{op}}$ ) appears to approximately equal zero.

Furthermore, it would have been obvious for one having ordinary skill in the art at the time the invention was made to configure the operating gap distance to approach approximately zero, in order to provide sufficient heat transfer between the monolith to the reactor tube walls, as suggested by Carmello et al.

The apparatus of Carmello et al. is the same as the instantly claimed apparatus, except that Carmello et al. fails to disclose that at least one monolithic catalyst or catalyst support structure comprises axially oriented variations, i.e., grooves, about its circumference, or that the operating gap distance between the reactor tube and the monolithic catalyst or catalyst support structure varies along the length of the reactor tube.

Beck teaches a heat exchange apparatus comprising a plurality of tubes **38** and a plurality of cores **22** disposed within the tubes, wherein the tubes and cores comprise heat conductive materials (see column 4, lines 26-35), and wherein the outer diameter of each core **22** is in contact with the inner diameter of each tube **38** (see column 2, lines 10-17), thereby allowing for conductive heat transfer between the core and the tube. In particular, the cores **22** are provided with axially oriented variations, i.e., grooves **50** of any desired number, about the circumference, and a varying operating gap distance (i.e., due to additional grooves **52**) along the length of the

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tube **38**. (see, e.g., FIGs. 1-5; column 3, line 51 to column 5, line 51).

It would have been obvious for one of ordinary skill in the art at the time the invention was made to provide axially oriented variations, i.e., grooves, along the circumference of at least one monolithic catalyst or catalyst support structure of Carmello et al., and to further vary the operating gap distance along the length of the reactor tube of Carmello et al., on the basis of suitability for the intended catalytic reaction, because the variations along the circumference and length would help improve heat transfer performance in a number of ways, as taught by Beck (see, e.g., column 1, line 68 to column 2, line 9).

Regarding claim 3, Carmello et al. further discloses that the reactor tube may comprise multiple monolithic catalyst or catalyst support structures disposed within the tube in end-to-end thermal contact with one another (see section [0024]; also, FIG. 2).

### ***Response to Arguments***

3. Applicant's arguments with respect to claims 1-4, 6 and 12 have been considered but are moot in view of the new ground(s) of rejection, as necessitated by amendment.

### ***Conclusion***

4. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a).

Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period

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will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

\* \* \*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JENNIFER A. LEUNG whose telephone number is (571) 272-1449. The examiner can normally be reached on 9:30 am - 5:30 pm Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn A. Caldarola can be reached on (571) 272-1444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jennifer A. Leung/  
Primary Examiner, Art Unit 1797